

1-60. (CANCELED)

61. (NEW) A method of forming one of an implant and a prosthesis, the method comprising the steps of:

forming a material, inert to living cells, into a porous support structure and at least one of shaping and sizing the porous support structure into one of an implant and a prosthesis having a shape and a size corresponding to a shape and size of a human body part to be replaced;

applying a boundary layer of material impervious to the living cells to the porous support structure;

introducing the living cells into the porous support structure;

promoting cell growth by introducing at least one of nutrients and oxygen to the living cells;

following formation of one of the implant and the prosthesis, removing the boundary layer and thereby resulting in one of the implant and the prosthesis formed from the porous support structure and the living cells in which one of the implant and the prosthesis has the shape and the size which corresponds to the shape and the size of the human body part to be replaced.

62. (NEW) The method according to claim 61, further comprising the step of forming the porous support structure (1) as a place holder material which is one of removable, from one of the implant and the prosthesis, and convertible by the cells (2).

63. (NEW) The method according to claim 61, further comprising the step of forming the porous support structure (1) from phosphate.

64. (NEW) The method according to claim 61, further comprising the step of forming the boundary layer (4) from one of a biological material and a synthetic material.

65. (NEW) The method according to claim 64, further comprising the step of forming the boundary layer (4) from a hydrogel material.

66. (NEW) The method according to claim 61, further comprising the step of forming the boundary layer (4) from a gas permeable material.

67. (NEW) The method according to claim 61, further comprising the step of applying the boundary layer (4), which is impermeable to the cells, to the porous support structure by one of spraying and dipping in a bath (3).

68. (NEW) The method according to claim 61, further comprising the step of forming an intermediate layer, between the porous support structure (1) and the boundary layer (4), from a material which remains unbound to the support structure (1) so that the intermediate layer facilitates removal of the boundary layer from the porous support structure following production of one of the implant and prosthesis.

69. (NEW) The method according to claim 68, further comprising the step of forming the intermediate layer from at least one of a lipid layer, glycoproteins, proteins, a biodegradable layer and a removable layer.

70. (NEW) A method of forming one of an implant and a prosthesis, the method comprising the steps of:

- shaping and sizing a porous support structure, inert to living cells, into one of an implant and a prosthesis having a shape and a size corresponding to a shape and size of a human body part to be replaced;

- applying a boundary layer of material, impervious to the living cells, at least to an exterior the porous support structure;

- providing the porous support structure (1) with at least an inlet (5);

- introducing living cells into the porous support structure (1);

- introducing at least one of oxygen and nutrients into the porous support structure (1) and promoting cell growth, within the porous support structure, by allowing the living cells to consume the nutrients and the oxygen and to grow and conform to the shape and size of the porous support structure;

- following formation of one of the implant and the prosthesis, removing the boundary layer from the porous support structure thereby resulting in formation of one of the implant and the prosthesis formed from the porous support structure and the living cells in which one of the implant and the prosthesis has the shape and the size which corresponds to the shape and the size of the human body part to be replaced.

71. (NEW) The method according to claim 61, further comprising the step of forming the boundary layer (4) so as to be mechanically removable from the porous support structure following production of one of the implant and the prosthesis.

72. (NEW) The method according to claim 61, further comprising the step of forming the boundary layer (4) to be one of:

detachable from the porous support structure,
soluble from the porous support structure, and
vascularized, and
prevascularized.

73. (NEW) The method according to claim 61, further comprising the step of introducing a plurality of the porous support structures (1) into a nutrient solution to facilitate cell growth.

74. (NEW-WITHDRAWN) The method according to claim 64, further comprising the steps of forming the boundary layer (4) from an alginate which is polymerized in a calcium chloride solution and, after formation of the cell layer, removing the boundary layer (4) from the porous support structure (1) by dissolving the porous support structure (1) with a low-calcium solution.

75. (NEW-WITHDRAWN) The method according to claim 64, further comprising the step of forming the boundary layer (4) from an overgrowth of cells which forms a membrane.

76. (NEW-WITHDRAWN) The method according to claim 64, further comprising the step of forming the boundary layer (4) from one of cartilage cells, fibroblasts, osteoblasts and chondrocytes.

77. (NEW-WITHDRAWN) The method according to claim 61, further comprising the step of pressuring the porous support structure (1) via one of a liquid and a gaseous medium.

78. (NEW-WITHDRAWN) The method according to claim 77, further comprising the step of inserting the support structure (1) into a container (14) containing one of the liquid medium and the gaseous medium so as to pressurize the porous support structure (1).

79. (NEW-WITHDRAWN) The method according to claim 77, further comprising the steps of placing a protective film (20) around the support structure (1) to form a pressure chamber around the support structure (1), and pressurizing an exterior of the protective film (20).

80. (NEW-WITHDRAWN) The method according to claim 61, further comprising the steps of incorporating the porous support structure (1) into a nutrient circuit (11) and connecting the porous support structure (1) to an oxygen source.

81. (NEW-WITHDRAWN) The method according to claim 80, further comprising the step of connecting the porous support structure (1) to a nutrient reservoir (13) communicating with the nutrient circuit (11).

82. (NEW-WITHDRAWN) An apparatus for forming one of an implant and a prosthesis, the apparatus comprising:

- a porous support structure formed from a material inert to living cells, the porous support structure having a shape and a size corresponding to a shape and size of a human body part to be replaced, and the porous support structure having an inlet and an outlet;

- a boundary layer, formed from a material impervious to living cells, being applied the porous support structure;

- at least one cell layer being formed by introducing the living cells to the support structure;

- a source of at least one of nutrients and oxygen communicating with the inlet of the porous support structure for promoting cell growth; and

- an instrument for removing the boundary layer, following formation of one of the implant and the prosthesis, thereby resulting in one of the implant and the prosthesis formed from the porous support structure and the living cells in which one of the implant and the prosthesis has the shape and the size which corresponds to the shape and the size of the human body part to be replaced.

83. (NEW-WITHDRAWN) The apparatus according to claim 82, wherein a nutrient circuit (11) communicates with the inlet and the outlet of the porous support structure for supplying the nutrients and the oxygen to the at least one cell layer in order to promote cell growth.

84. (NEW-WITHDRAWN) The apparatus according to claim 82, wherein the support structure (1) is formed into a shape of a vertebra having a desired size.

85. (NEW-WITHDRAWN) The apparatus according to claim 82, wherein the support structure (1) is formed into a shape of a bone part having a desired size.

86. (NEW-WITHDRAWN) The apparatus according to claim 82, wherein a container (14), with at least one pressure connection (17) for connection to a pressure source (19), houses the porous support structure for applying a pressure thereto.